

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment		Quarry Pond (QP) Sediments	
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
1	<u>State the Problem</u>				
	i) Problem description	It is unknown whether the Site has a measurable impact on sediment quality in the GMR. Previous Great Miami River (GMR) sampling found PAH concentrations and some pesticide concentrations greater than conservative Ecological Screening Levels (ESLs), and arsenic and PAHs concentrations greater than USEPA Residential Soil RSLs. However, these common contaminants were also found, in similar concentrations, in upstream samples taken by OEPA (1995) in routine sampling of the GMR. Therefore, further data are needed to assess whether downstream concentrations are greater than upstream concentrations and, if so, whether downstream samples pose potential risks to ecological and human receptors.	If contaminant concentrations are greater than sediment benchmarks protective of aquatic life (Phase 1A-GMR), significantly greater than upstream concentrations (Phase 1B-GMR), and are potentially Site-related, a benthic community survey will be completed in accordance with USEPA Rapid Bioassessment Protocols (EPA 841-B-99-002) or OEPA assessment methods.	Previous QP sediment sampling found PAH concentrations greater than conservative ESLs, and arsenic and PAH concentrations greater than USEPA Industrial Soil RSLs. Further data are needed to assess whether QP sediments pose potential risks to ecological and human health risks.	
	ii) Planning team	See note at bottom			
	iii) Conceptual model	<ul style="list-style-type: none"><li>- Shallow groundwater from the Site typically flows towards the west and/or north towards the GMR, which could carry contaminants into its sediment.</li><li>- Contaminants in sediment can be toxic to benthic organisms.</li><li>-Fish may uptake contaminants in sediments and can be eaten by other fish, birds, and humans.</li></ul>			<ul style="list-style-type: none"><li>- Shallow and deep groundwater from the Site typically flows towards the west towards the QP, which could carry contaminants into its sediment.</li><li>- PAH concentrations greater than conservative ESLs, and arsenic and PAH concentrations greater than USEPA Industrial Soil RSLs, have been found in QP sediment.</li></ul>
		<ul style="list-style-type: none"><li>- Erosion of surface soils from the Site could also carry Site-related contaminants to the GMR and/or the QP, which is at a lower elevation, via overland surface flow.</li><li>- During flood events, off-site contaminants could be deposited on-site.</li><li>-Contaminants could be toxic to benthic organisms and impact other species in the aquatic ecosystem.</li><li>- Persons use the GMR and QP for recreation, mainly in boats; however, they could come into dermal contact with the sediment.</li><li>- Persons consume the fish caught in the QP.</li></ul>			

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment		Quarry Pond (QP) Sediments	
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
iv) General intended use for data	The sediment data collected will be compared against ESLs to assess whether aquatic ecosystem health is potentially impaired. The sediment data will be used to determine if bioaccumulative contaminants are present and to model edible fish concentrations for the HHRA. Additionally, CRA will compare the data to USEPA Industrial Soil RSLs as a screening evaluation to identify potential human health risks. Industrial Soil RSLs are proposed as a surrogate for human exposure risks from sediments, due to the limited exposure frequency in the GMR compared to a residential exposure scenario. The data collected will ultimately be used in the Baseline Risk Assessment for OU2.				
v) Resources, constraints, deadlines	Sufficient resources will be committed to sample sediments under the OU2 RI/FS work plan.				Sufficient resources will be committed to sample sediments under the OU2 RI/FS work plan.

2 Goals of the Study:

i) Primary study question	Does sediment in the GMR and/or QP contain Site-related contaminants at concentrations greater than ESLs and/or Industrial Soil RSLs for protection of human health?	Does the Site add significantly to contaminants in sediments in the GMR adjacent to and down-gradient of the Site?	Are benthic organisms at risk due to sediment concentrations caused by Site-related contamination?	Do sediments in the QP contain contaminant concentrations greater than ESLs and/or Industrial Soil RSLs for protection of human health?
---------------------------	--	--	--	---

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment		Quarry Pond (QP) Sediments	
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
ii) Alternate outcomes or actions	<div>- If sampling demonstrates that contaminants in sediment are less than screening levels/criteria, no further sampling is planned.</div> <div>- If sampling demonstrates that contaminants are present at concentrations greater than screening levels/criteria, and that contaminant concentrations are greater than upstream conditions (see Phase 1B-GMR to right), further evaluation and/or remedial measures may be warranted.</div> <div>- If sampling demonstrates conditions adjacent to the Site are less than or equal to those found upstream, no further sampling is planned.</div> <div>- If sampling demonstrates contaminant concentrations are greater than those upstream, and that contaminant concentrations are greater than Action Level criteria (see Phase 1A-GMR to left), further evaluation and/or remediation may be warranted. Further evaluation may consist of an ecological study (i.e., benthic community study; see Phase 2-GMR to the right).</div> <div>- If the community survey demonstrates that aquatic life in the GMR is not affected by Site-related contaminants, no further sampling is planned.</div> <div>- If the community survey demonstrates that Site-related contaminants impair aquatic life in the GMR and/or the QP, further evaluation and/or remedial measures may be warranted.</div> <div>- If sampling demonstrates that contaminants in sediment are less than screening levels/criteria, no further sampling is planned.</div> <div>- If sampling demonstrates that contaminants are present at concentrations greater than screening levels/criteria, further evaluation and/or remedial measures may be warranted (i.e., acute bioassays on representative QP sediments).</div>				
iii) Type of problem (decision or estimation) <sup>1</sup>	Decision (Action Level)				
iv.a) Decision statement	<div>Determine whether any contaminant concentrations are greater than Industrial Soil RSLs, ESLs, or if the sum of Equilibrium Partitioning Sediment Benchmark Toxic Units (ΣESBTUFCV) &gt; 1, or if the organic carbon normalized excess Simultaneously Extracted Metal (ΣSEM) &gt; 150 μmol/goc in the GMR sediments near the Site, or if the concentrations of arsenic are greater than its Probable Effects Concentration (PEC).</div> <div>Determine whether any measurable input of contaminants from the Site, relative to upstream conditions, occurs in the GMR sediments near the Site.</div> <div>Determine whether any measureable impact to aquatic life in the GMR occurs due to contaminants from the Site, relative to upstream conditions</div> <div>Determine whether any contaminant concentrations are greater than ESLs, USEPA Industrial soil criteria, Sum of Equilibrium Partitioning Sediment Benchmark Toxic Units (ΣESBTUFCV) &gt; 1, or organic carbon normalized excess Simultaneously Extracted Metal (ΣSEM) &gt; 150 μmol/goc in the on-Site pond sediments near the Site.</div>				

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment			Quarry Pond (QP) Sediments
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
iv.b) Estimation statement & assumptions	--				

3 Identify Information Inputs:

i) Information types needed	Sediment sample analysis is required to assess conditions in the GMR near the Site.		A Benthic community survey may be required to assess the impact to aquatic life in the GMR near the Site.	Sediment sample analysis is required to assess conditions in the QP.
ii) Information Sources	- New data from the investigation will form the basis of assessment. The results from three previous sediment samples collected from the GMR and QP, as well as results of soil samples will be considered during interpretation of the data obtained. - Sediment samples will be analyzed for PAHs, divalent metals (copper, cadmium, mercury, nickel, lead and zinc) using AVS/SEM analyses, and total metals (including arsenic), organic carbon, black carbon, major anions (chloride, fluoride, cyanide, nitrate, nitrite, sulphate, sulphide) and indicator parameters (pH, temperature, conductivity, oxidation reduction potential (ORP), and dissolved oxygen, and reduction-oxidation (REDOX) parameters.		- New data from the community survey will form the basis of assessment. The results from Phase 1A-GMR and 1B-GMR(see left) will be considered during interpretation of the data obtained.	- New data from the investigation will form the basis of assessment. The results from previous sediment samples collected from the QP, as well as results of soil samples will be considered during interpretation of the data obtained. Sediment samples will be analyzed for PAHs, divalent metals (copper, cadmium, mercury, nickel, lead and zinc) using AVS/SEM analyses, and total metals (including arsenic), organic carbon, black carbon, major anions (chloride, fluoride, cyanide, nitrate, nitrite, sulphate, sulphide) and indicator parameters (pH, temperature, conductivity, oxidation reduction potential (ORP), and dissolved oxygen, and reduction-oxidation (REDOX) parameters.
iii) Basis of Action Level	Action levels are: - Industrial Soil RSLs - Final Chronic Values (FCV) for PAHs, ΣESBTUFCV < 1 - Excess SEM < 150 µmol/goc - PEC values for arsenic	The selected action level is a background threshold value (e.g., 95th percentile) based on upstream conditions.	Population and community level response will be evaluated.	Action levels are: - Industrial Soil RSLs - Final Chronic Values (FCV) for PAHs, ΣESBTUFCV < 1 - Excess SEM < 150 µmol/goc - PEC values for arsenic

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment			Quarry Pond (QP) Sediments
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
iv) Appropriate sampling & analysis methods	Methods are described in the Field Sampling Plan (CRA, May, 2013, CRA's Standard Operating Procedures, and the Quality Assurance Project Plan (CRA, September 2008). Organic carbon in sediments will be analyzed using the Lloyd Kahn or Walkley-Black methods. PAH results will be evaluated against ΣESBTUFCV, as detailed in USEPA, 2003. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. EPA-600-R-02-013. Divalent metals results will be evaluated against the organic carbon normalized excess ΣSEM.		A benthic community survey will be completed in accordance with USEPA Rapid Bioassessment Protocols (EPA 841-B-99-002) or OEPA assessment methods (OEPA, 1989. Biological criteria for the protection of aquatic life), depending on the habitat.	Methods are described in the Field Sampling Plan, CRA's Standard Operating Procedures, and the Quality Assurance Project Plan. Organic carbon in sediments will be analyzed using the Lloyd Kahn or Walkley-Black methods. PAH results will be evaluated against ΣESBTUFCV, as detailed in USEPA, 2003. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. EPA-600-R-02-013. Metals results will be evaluated against the organic carbon normalized excess ΣSEM.	

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment			Quarry Pond (QP) Sediments
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
4	<u>Define the Boundaries of the Study:</u>				
i) Target population, sample units	The target population are the upper (available) layer of sediments (0 - 6 inches below sediment/water interface), and subsurface sediment (greater than 6 inches below sediment/water interface) in the GMR adjacent to the Site. The sampling units are individual grab samples collected from the near-Site reaches of the GMR. Areas easily accessible to humans and with evidence of use will be targeted for sediment sample locations (e.g., areas where anglers or other recreational users are present; areas where water is approximately 3 ft deep and where sediment can support body weight. Depositional areas will also be targeted to identify potential ecological risks. Sediment samples will also be collected in depositional locations immediately downstream of any point discharges identified between the upstream dam and the southern Site boundary. The sediment sample locations may be adjusted based on the location of intermittent drainage pathways (if any).	The target population is the upper (available) layer of sediments (0 - 6 inches below sediment/water interface) and subsurface sediment (greater than 6 inches below sediment/water interface) in the upstream sampling locations. The sampling units are individual grab samples collected from the upstream reaches of the GMR. Areas easily accessible to humans and with evidence of use will be targeted for sediment sample locations (e.g., areas where anglers or other recreational users are present; areas where water is approximately 3 ft deep and where sediment can support body weight. Depositional areas will also be targeted to identify potential ecological risks. Sediment samples will be collected in depositional locations immediately downstream of any point discharges identified between the upstream dam and east of the Dryden Road bridge. The sediment sample locations may be adjusted based on the location of intermittent drainage pathways (if any).	The target population is the aquatic life in the GMR in the vicinity of the Site. The sampling units are composite samples collected from the GMR, divided by upstream, near-Site, and downstream reaches. Sampling efforts may be concentrated in near-shore habitats, where most species will be collected.	The target populations are the upper (available) layer of sediments (0 - 6 inches below sediment/water interface), and subsurface sediment (greater than 6 inches below sediment/water interface) in the QP. The sampling units are individual grab samples collected from the QP. Depositional areas and areas where visual evidence of potential leachate migration is observed will be targeted for sediment sample locations. The sample locations may be adjusted based on the locations of intermittent drainage pathways, storm water runoff pathways, if any are identified, and the results of underwater survey inspections conducted by Ohio EPA, Ohio DNR and the District Attorney's office, to include consideration of any areas where foreign objects may have been deposited and the likelihood of sediment contamination may be greater.	

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment		Quarry Pond (QP) Sediments	
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
ii) Specify spatial boundaries	Near-Site sampling locations are those occurring to the west of the Dryden Road bridge (i.e., as surface water passes the Site), and these will be located on the near (south and east) shore of the GMR. Sediment samples will be collected from the top of the sediment layer (i.e., 0 - 6 inches below the sediment/water interface), and subsurface sediments (i.e., greater than 6 inches below the sediment/water interface) in the GMR.				
iii) Specify temporal boundaries	Upstream sampling locations are to the east of the Dryden Road bridge. Sediment samples will be collected from the top of the sediment layer (i.e., 0 - 6 inches below the sediment/water interface), and subsurface sediments (i.e., greater than 6 inches below the sediment/water interface) in the GMR.				
iv) Identify any other practical constraints	Upstream sampling locations are to the east of the Dryden Road bridge. Near-Site sampling locations are those occurring to the west of the Dryden Road bridge (i.e., as surface water passes the Site), and these will be located on the near (south and east) shore of the GMR. Downstream sampling locations are to the south of the City of Dayton Wastewater Treatment Plant.				
v.a) Scale of inference for decision making	Sediment samples will be collected from the top of the sediment layer (i.e., 0 - 6 inches below the sediment/water interface), and subsurface sediments (i.e., greater than 6 inches below the sediment/water interface) in the QP.				
v.b) Scale of estimates	The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on exposure assumptions forming the basis for the Action Levels. Initial monitoring will occur over two sampling rounds.				
	The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on exposure assumptions forming the basis for the Action Levels.				
	Sampling may be postponed due to flooding or iced conditions in the GMR. If any dams/weirs are encountered, samples will be collected from the side of the dam closest to the Site (i.e., downstream of any upstream dams, and upstream of any downstream dams).				
	Sampling may be postponed due to flooding or iced conditions of the QP.				
	Comparisons to Action Levels will be carried out on an individual-location basis.				
	Comparisons to upstream conditions will be carried out on an individual-location basis.				
	Criteria in biological indices will be used to evaluate the impacts on aquatic life.				
	Comparisons to Action Levels will be carried out on an individual-location basis.				
	--				

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment			Quarry Pond (QP) Sediments
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
5	<u>Develop the Analytic Approach:</u>				
	i.a) Specify Action Level	- Industrial Soil RSLs - Final Chronic Values (FCV) for PAHs, $\sum$ ESBTUFCV < 1 - Excess SEM < 150 $\mu$ mol/goc - PEC values for arsenic	Background Threshold Values based on upstream data, following USEPA's ProUCL Technical Guide (2013)	Criteria in biological indices, consisting of the Index of Well-Being (Gammon 1976; Gammon <i>et al.</i> 1981), the Index of Biotic Integrity (Karr 1981; Fausch <i>et al.</i> 1984), and the Invertebrate Community Index (DeShon <i>et al.</i> unpublished)	- Industrial Soil RSLs - Final Chronic Values (FCV) for PAHs, $\sum$ ESBTUFCV < 1 - Excess SEM < 150 $\mu$ mol/goc - PEC values for arsenic
	i.b) Specify estimator	--	--	--	--
	ii.a) Specify population parameter of interest and theoretical decision rule	Individual observations at near-Site sampling locations.		Cumulative observations at near-Site sampling locations.	Individual observations at near-Site sampling locations.
	ii.b) Specify estimation procedure	--	--	--	--



TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment		Quarry Pond (QP) Sediments	
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
6	<u>Specify Performance or Acceptance Criteria:</u>				
	i.a) Set baseline (null) and alternative hypotheses	Baseline H <sub>0</sub> : sediment concentrations are less than Action Levels Alternative H <sub>1</sub> : sediment contaminant concentrations are greater than Action Levels	Baseline H <sub>0</sub> : Concentrations of Site-related chemicals in near-Site sediments are no different than upstream Alternative H <sub>1</sub> : Concentrations of Site-related chemicals in near-Site sediments contain contaminants at concentrations greater than upstream conditions	Baseline H <sub>0</sub> : aquatic ecosystem in near-Site reaches are no different than upstream Alternative H <sub>1</sub> : aquatic ecosystem in near-Site reaches is impaired in comparison to upstream conditions.	Baseline H <sub>0</sub> : sediment concentrations are less than Action Levels Alternative H <sub>1</sub> : sediment contaminant concentrations are greater than Action Levels
	i.b) Specify how uncertainty accounted for in estimate	--	--	--	--
	ii.a) Determine impact of decision errors (false positives/negatives)	N/A: no statistical test is employed (direct comparison to Action Levels)	- If a false positive (Type I) error occurs, unnecessary additional investigation may occur. - If a false negative (Type II) error occurs, conditions that are not due to background concentrations and pose potential risk to aquatic ecosystem and/or human receptors could persist.	- If a false positive (Type I) error occurs, unnecessary additional investigation may occur. - If a false negative (Type II) error occurs, conditions posing potential risk to the aquatic ecosystem could persist.	N/A: no statistical test is employed (direct comparison to Action Levels)
	ii.b) Specify confidence level for estimate	--	--	--	--

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment		Quarry Pond (QP) Sediments	
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
	iii) Specify "gray region" for test	N/A: no statistical test is employed (direct comparison to Action Levels)	For comparisons to upgradient conditions, the gray region will be set equal to a difference in means (on-Site and upgradient) of one standard deviation of the upgradient data.	--	N/A: no statistical test is employed (direct comparison to Action Levels)
	iv.a) Set tolerable limits on decision errors	N/A: no statistical test is employed (direct comparison to Action Levels)	The Background Threshold Values will be calculated using a 95 percent confidence level, making the false positive rate no greater than 5 percent. Limits on the false negative rate are not appropriate for comparisons of individual results to threshold values.	--	N/A: no statistical test is employed (direct comparison to Action Levels)
	iv.b) Specify performance or acceptance criteria	Total sediment concentrations will be used in the comparison to Action Levels, rather than subtracting background concentrations, for evaluation in the Ecological Risk Assessment.		--	Total sediment concentrations will be used in the comparison to Action Levels, rather than subtracting background concentrations, for evaluation in the Ecological Risk Assessment.

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment		Quarry Pond (QP) Sediments	
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
7	<u>Develop the Plan for Obtaining Data:</u>				
	i) Select sampling design	<p>Near-Site samples will be collected in two sampling events close to the proximate (south/east) shore of the river at (i) the upstream edge of the Site, including both a near-shore and far-shore sample; (ii) mid-Site, downgradient of monitoring wells containing highest VOC concentrations on the side of the Site nearest the river; (iii) further downstream in the mid-Site region, halfway between (ii) and (iv); (iv) downstream of the main Site, upstream of the City's WWTP outlet; and (v) downstream of the entire Site.</p> <p>Samples will be biased towards locations with fine-grained sediments with higher organic carbon (based on visual observation). Proposed sample locations will be adjusted in the field to ensure that the samples are collected from sediments most representative of potential worst-case issues.</p>	<p>Upstream samples will be collected in two sampling events at 9 locations to provide a suitable data set (per USEPA's ProUCL Technical Guide, 2010) for the calculation of Background Threshold Values. Upstream samples will be collected along 3 transects of 3 samples each, regularly spaced downstream of the upstream dam, and upstream low-head of the Site.</p> <p>Near-Site samples will be collected as described in Phase 1A (see left).</p>	<p>Near-Site samples will be collected close to the proximate (south/east) shore of the river at (i) the upstream edge of the Site, including both a near-shore and far-shore sample; (ii) mid-Site, downgradient of monitoring wells containing highest VOC concentrations on the side of the Site nearest the river; (iii) further downstream in the mid-Site region, halfway between (ii) and (iv); (iv) downstream of the main Site, upstream of the City's WWTP outlet; and (v) downstream of the entire Site.</p> <p>The sampling effort may be concentrated in near-shore habitats where most species will be collected and will be biased toward areas where the greatest sediment impacts were identified during the Phase 1A and 1B investigations.</p>	<p>Up to 9 samples will be collected from the Quarry Pond, along 3 transects of 3 samples each.</p> <p>Samples will be biased towards locations with fine-grained sediments with higher organic carbon (based on visual observation). Proposed sample locations will be adjusted in the field to ensure that the samples are collected from sediments most representative of potential worst-case issues.</p>

TABLE 3.5  
SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS – SEDIMENT INVESTIGATION  
OU2 RI/FS WORK PLAN  
SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO

DQO Step	Medium:	GMR Sediment		Quarry Pond (QP) Sediments	
	Investigation Phase:	Phase 1A – GMR	Phase 1B – GMR	Phase 2 - GMR	Phase 1A - QP
	Investigation Item:	Comparison to Human Health and Ecological Screening Values	Comparison to Upstream Conditions	Benthic Sampling	Comparison to Human Health and Ecological Screening Value
ii) Specify/evaluate key assumptions supporting the design	The mechanisms of contaminant transport from the Site to river sediments, i.e., via groundwater migration and seepage or via erosion and runoff, would result in greatest impacts (if any) near-shore and potentially, due to groundwater seepage, midstream. Sampling locations have been selected reflecting this, and covering different potential directions of transport and deposition, covering the full range of possibilities from the Site.	The calculation Background Threshold Values (statistical limits on an upper percentile, e.g. 95th) for the upstream population of sediments depends on data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2013). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated.	The mechanisms of contaminant transport from the Site to river sediments, i.e., via groundwater migration and seepage or via erosion and runoff, would result in greatest impacts (if any) near-shore. Sampling locations have been selected reflecting this, and covering different potential directions of transport and deposition, covering the full range of possibilities from the Site.	The mechanisms of contaminant transport from the Site to pond sediments, i.e., via groundwater migration and seepage or via erosion and runoff, would result in greatest impacts (if any) near-shore. Sampling locations have been selected reflecting this, and covering different potential directions of transport and deposition, covering the full range of possibilities from the Site.	

Notes  
:

- [1] If investigating a "decision problem", follow items ending in ".a" in subsequent DQO steps (e.g., "ii.a" or "iii.a").  
If investigating an "estimation problem", follow ".b" items.  
Once the baseline risk assessment for OU2 has been performed, possible remedial goals (PRGs) will be derived from the calculator using site-specific risks.
- Item not applicable for the type of problem (decision vs. estimation) investigated.

The planning team includes:  
Respondents: Ken Brown (ITW); Jim Campbell (ITW); Bryan Heath (NCR); Wendell Barner (TRW)  
Steve Quigley (CRA Project Director); Adam Loney (CRA project manager);  
Wesley Dyck, Daniela Araujo (CRA statistics expert);  
April Gowing, Steve Harris, Vincent Nero and Dan Smith (CRA risk assessment experts);  
Paul Wiseman, Rawa Fleisher, Angela Bown (CRA chemists/quality assurance staff);  
Julian Hayward, Valerie Chan (CRA project engineers); Mark Hilverda (CRA project hydrogeologist);  
Leslie Patterson (USEPA Regional Project Manager); Maddie Smith (Ohio EPA representative); and property owner stakeholders.